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The Role of Pregnancy Concerns in the Relationship between Substance Use and Unprotected Sex among Adolescents

Allyson L. Dir^{a,b}, Leslie A. Hulvershorn^{b,c}, and Matthew C. Aalsma^{a,b}

^aDepartment of Pediatrics, Section of Adolescent Medicine, Indiana University School of Medicine, Indianapolis, IN, USA

^bAdolescent Behavioral Health Research Program, Indiana University School of Medicine, Indianapolis, IN, USA

^cDepartment of Psychiatry, Section of Adolescent Medicine, Indiana University School of Medicine, Indianapolis, IN, USA

Abstract

Background: Substance use and unprotected sex are prevalent among adolescents. The link between substance use and unprotected sex is well-established. Research has also highlighted how adolescents' attitudes and risk perceptions regarding unprotected sex, including concerns about pregnancy ("Getting pregnant would force me to grow up too fast"), are associated with unprotected sex and unplanned pregnancy. However, less research has examined the potential relationship between pregnancy concerns and substance use among adolescents.

Objectives: The study prospectively examined (1) differences in pregnancy concerns across patterns of substance use and (2) whether pregnancy concerns mediate the relationship between substance use and later unprotected sex among a sample of middle and high school students.

Method: 98 adolescents [$M(SD)$ age = 14.28(1.68), 59.4% female, 59.4% black/African American] completed self-report measures of marijuana and alcohol use, pregnancy concerns, and unprotected sex across three time points over 6months (T1–T3).

Results: Substance users (alcohol/marijuana) reported fewer pregnancy concerns compared to non-substance users ($t = 2.99, p = .04$). Pregnancy concerns at T2 mediated the relationship between T1 lifetime substance use and later unprotected sex (T3) (indirect effect: $b = 0.10, CI[.01-.41]$; direct effect: $b = 0.15, p = .32$), controlling for gender, age, and race. More frequent substance use (T1) was related to fewer pregnancy concerns at T2 ($b = -0.10, p = .04$); fewer pregnancy concerns were related to increased likelihood of later unprotected sex ($b = -1.02, p = .02$).

Conclusions: Findings offer new insight into associations between substance use and unprotected sex and suggest that substance use and sexual health interventions should target pregnancy concerns.

CONTACT Allyson L. Dir adir@iupui.edu Department of Pediatrics, Section of Adolescent Medicine, Indiana University School of Medicine, 410 W. 10th St., Suite 1001, Indianapolis, IN 46202, USA.

Declaration of interest

The authors declare that they have no conflict of interest. The authors alone are responsible for the content and writing of the article.

Keywords

Adolescent substance use; unprotected sex; sexual attitudes; pregnancy concerns

Introduction

Adolescence (aged 13–18) is a period when individuals typically begin engaging in substance use and sexual behavior (Tapert, Aarons, Sedlar, & Brown, 2001). Almost 50% of adolescents report any lifetime substance use, with alcohol and marijuana the most commonly reported substances; up to 32% of youth (aged 13–25) report lifetime marijuana use and 63% report ever drinking alcohol (Kann et al., 2018). Unprotected sex is also prevalent among adolescents; 43% of high school students report not using a condom at last intercourse (Copen, 2017). Substance-using adolescents are more likely to engage in unprotected sex compared to non-substance users, and subsequently, are at higher risk for STIs and unplanned pregnancy (Tapert et al., 2001). In addition to substance use, adolescents' attitudes and risk perceptions regarding sex, including concerns about getting pregnant (e.g., "I would be forced to grow up too fast"), are also associated with unprotected sex (e.g., Brückner Martin, & Bearman, 2004; Jaccard, Dodge, & Dittus, 2003). However, the link between pregnancy concerns and substance use is unstudied. We prospectively examined relationships between substance use, pregnancy concerns, and unprotected sex among adolescents.

The association between adolescent substance use and unprotected sex is well-documented (Connell, Gilreath, & Hansen, 2009). Although extensive research has highlighted event-level relationships between marijuana (Kingree, Braithwaite, & Woodring, 2000; Schumacher, Marzell, Toepp, & Schweizer, 2018) and alcohol (Dvorak et al., 2016; Kilwein & Looby, 2018) use and unprotected sex, there are likely other non-event-level explanations for higher rates of unprotected sex and unplanned pregnancy among substance-using adolescents. Specifically, there is evidence that sex-related attitudes and risk perceptions regarding sex are associated with actual sexual behaviors (Albarracín et al., 2005); for example, attitudes toward condoms are associated with actual condom use among adolescents (Halpern-Felsher, Kropp, Boyer, Tschann, & Ellen, 2004; Weinman, Small, Buzi, & Smith, 2008). Further, a recent study found that substance-using adolescents had lower perceived risks of engaging in unprotected sex compared to non-substance users (Dir et al., 2017). Therefore, we propose that one reason for higher rates of unprotected sex and other sexual risk-taking among substance-using adolescents may also be due to unique sex-related attitudes and risk perceptions that in turn influence sexual behavior.

Similar to sex-related attitudes are concerns about pregnancy, which reflect individuals' beliefs and concerns about getting pregnant (Jaccard et al., 2003). Adolescents' pregnancy concerns are related to unprotected sex and actual unplanned pregnancy. For example, longitudinal studies of adolescent girls found that fewer pregnancy concerns and even ambivalent pregnancy attitudes predicted inconsistent condom use (Crosby, DiClemente, Wingood, Davies, & Harrington, 2002; Davies et al., 2006) and unplanned pregnancy (Sipsma, Ickovics, Lewis, Ethier, & Kershaw, 2011). Cross-sectional studies have also

shown similar relationships between pregnancy concerns and contraceptive use (Miller, Trent, & Chung, 2014) among girls *and* boys (Davies et al., 2003, 2004; Lewin, Mitchell, Hodgkinson, Gilmore, & Beers, 2014).

Despite higher rates of unplanned pregnancy among substance-using adolescents (Connery, Albright, & Rodolico, 2014), research on the association between pregnancy concerns and substance use is lacking. One retrospective study of adolescent mothers found that substance users were more likely to report that they “didn’t mind getting pregnant” as a reason for not using contraception compared to non-substance users (Stevens-Simon, Kelly, Singer, & Cox, 1996). Still, no research has examined whether pregnancy concerns play a prospective role in the relationship between substance use and unprotected sex. Examination of pregnancy concerns is important because many successful sexual health programs target changing individuals’ beliefs and attitudes about unprotected sex and contraception (Albarracín et al., 2005). Understanding pregnancy concerns and the potential role of pregnancy concerns in the risk for unprotected sex among adolescent substance users could inform prevention/intervention strategies for reducing unprotected sex among this high-risk group.

The goal of the study was to examine whether there are differences in concerns about pregnancy among adolescent substance users and non-substance users, and subsequently, whether pregnancy concerns may, in part, explain the higher risk of unprotected sex among adolescent substance users. We prospectively examined relationships between lifetime substance use (alcohol and marijuana), pregnancy concerns, and unprotected sex among a sample of middle and high school students. We hypothesized that (1) adolescent substance users would report fewer pregnancy concerns and be more likely to report unprotected sex compared to non-substance users and (2) pregnancy concerns would prospectively mediate the relationship between substance use at baseline and later unprotected sex.

Methods

Participants and procedures

A sample of 101 adolescents [$M(SD)$ age = 14.28(1.68), range 12–19; 59.4% female; 59.4% black/African American; see Table 1] were recruited from urban public middle and high schools to complete surveys at three time points across 6 months (T1 = baseline, T2 = 3 months, T3 = 6 months). Informed consent/assent was obtained from adolescents/caregivers at baseline. Adolescents completed online questionnaires at baseline, T2, and T3 at their home/preferred location and received \$25 gift cards at each time point, per IRB approval. Of the 101 adolescents who completed the study, $N = 98$ with complete data were used for analyses.

Measures

Unprotected sex—One question at T3 asked whether individuals used protection/contraception during their last vaginal sex experience since T2 (0 = *protection used*, 1 = *no protection used*). We included all adolescents regardless of sexual history given that attitudes influence sexual decision-making broadly; thus, individuals who responded that they had never had sex were given a score of 0.

Pregnancy concerns—At T2, five items assessed adolescents' concerns regarding pregnancy (e.g., “*you/your partner getting pregnant at this time is one of the worst things that could happen*”; Jaccard et al., 2003). Responses ranged from 1 (*strongly disagree*) to 5 (*strongly agree*), with higher mean scores reflecting more concerns about getting pregnant ($\alpha = .72$ in the current sample).

Substance use—Participants reported separately on lifetime marijuana and alcohol use at T1, with responses for each as follows: 0 = no lifetime use, 1 = *1–2 times*, 2 = *3–9 times*, 3 = *10–19 times*, 4 = *20–30 times*, 5 = *40–99 times*, 6 = *100+ times*; see Johnston, Bachman, & O'Malley, 1995). An overall substance use score was created by summing the responses for alcohol and marijuana use. We also categorically assigned participants to groups representing substance use patterns: no use, marijuana-only, alcohol-only, or dual alcohol + marijuana.

Analytic strategy

In preliminary exploratory analyses, we examined differences in pregnancy concerns and unprotected sex across substance use patterns (no use vs. alcohol-only vs. marijuana-only vs. alcohol + marijuana). We then conducted a binomial regression mediation model using the PROCESS macro (Hayes, 2012), which uses bootstrapping confidence intervals to determine indirect effects; overall lifetime substance use (T1) was the independent variable, pregnancy concerns (T2) was the mediator, and unprotected sex (T3) was the dependent variable. Gender, race, and age were control variables.

Results

Overall, 26.5% ($n = 26$) reported ever using marijuana and 20.4% ($n = 20$) reported ever using alcohol; among those who reported any substance use ($n = 32$), 44% were dual marijuana alcohol users (see Table 1). Older adolescents reported more frequent lifetime marijuana ($r = .29, p < .01$) and alcohol use ($r = .35, p < .01$); there were no differences across gender or race (p 's $> .10$). Overall, of individuals that reported ever having sex (28.7%, $n = 29$), 58.6% ($n = 17$) reported recent unprotected sex at T3. Older individuals were more likely to report unprotected sex ($r = .21, p = .04$); there were no differences across gender or race (p 's $> .10$). Regarding what type of contraception/protection individuals/their partners *typically* use (i.e., not in reference to specific sexual encounter), 23.8% reported condom use ($n = 10$ boys, $n = 14$ girls) and 21.67% of girls reported using some form of contraception (see Table 1). Females reported more pregnancy concerns than males ($t = 3.59, p = .001$), and older individuals reported *fewer* pregnancy concerns ($r = .26, p = .01$); there were no differences across race ($r = .15, p = .15$). Alcohol + marijuana users reported higher rates of unprotected sex ($\chi^2 = 19.91, p < .001$) and fewer pregnancy concerns ($F = 3.21, p = .03$) compared to non-users, alcohol-only, and marijuana-only users (p 's $> .05$; Table 2).

In the mediation model, pregnancy concerns (T2) significantly mediated the relationship between base-line lifetime substance use and later unprotected sex (T3) (indirect effect: $b = 0.10, CI[0.01–0.41]$), controlling for gender, race, and age. Baseline substance use ($b = 0.10, p = .04$) and gender ($b = 0.53, p = .002$) were significantly related to T2 pregnancy attitudes.

The direct effect of baseline substance use on unprotected sex (T3) was not significant ($b = 0.15$, $p = .32$). Pregnancy concerns (T2) significantly predicted T3 unprotected sex ($b = 1.02$, $p = .02$). See Figure 1 for full results (model $R^2 = .22$).

Discussion

This is the first study to examine pregnancy concerns across substance use patterns, and whether pregnancy concerns may, in part, explain the relationship between substance use and unprotected sex.

As hypothesized, substance users reported significantly fewer pregnancy concerns compared to non-substance users. This is consistent with a recent study that found that adolescent substance users perceived fewer risks of engaging in unprotected sex compared to non-substance users (Dir et al., 2017). Further, pregnancy concerns prospectively mediated the relationship between baseline substance use and later unprotected sex; greater lifetime substance use was related to fewer pregnancy concerns, which in turn, increased risk for later unprotected sex, even across age, gender, and race. In other words, substance users in the sample were less concerned about pregnancy or were less likely to think about how getting pregnant (or their partner getting pregnant) may impact their lives, and this lack of concerns, in part, influenced their sexual decision-making.

This prospective model offers a novel pathway explaining the relationship between substance use and unprotected sex. In contrast to evidence for event-level relationships between substance use and unprotected sex that can be explained by the alcohol myopia theory (e.g., MacDonald, MacDonald, Zanna, & Fong, 2000) and expectancy and motive theories (Dermen, Cooper, & Agocha, 1998; Dvorak et al., 2016; Kilwein & Looby, 2018), results highlight a more distal relationship between substance use and unprotected sex. One explanation for findings could be related to peer affiliation (Staras, Tobler, Maldonado-Molina, & Cook, 2011); there may be unique group norms regarding sexual risk and pregnancy among adolescent substance users, and thus, affiliation with substance-using peer groups may influence one's attitudes about sexual risk and concerns about pregnancy. In turn, these pregnancy concerns may affect one's sexual decision-making. Alternatively, research has identified phenotypes for risk-taking propensity (Cooper, Wood, Orcutt, & Albino, 2003; Zuckerman & Kuhlman, 2000), and it could be that these underlying traits (e.g., impulsivity, risk-taking propensity) related to substance use and sexual risk-taking also influence development of concerns regarding pregnancy. Findings offer important preliminary evidence for future research to better understand the mechanisms underlying these pathways.

These findings also underscore the need to improve sexual risk prevention/intervention targeting substance users. Although there are existing interventions that target both substance use and sexual risk-taking (e.g., Hopset al., 2011), results of such programs have shown limited effectiveness (Letourneau, McCart, Sheidow, & Mauro, 2017; Tolou-Shams et al., 2011). Many programs focus on teaching risk reduction skills (Letourneau et al., 2017); however, our findings for the role of pregnancy concerns in sexual behavior suggest that other non-behavioral strategies may be effective. Utilization of motivational interviewing

techniques to discuss adolescents' concerns about pregnancy and provide psychoeducation about the implications of pregnancy and early parenthood (i.e., financial burden) and how their behavior aligns with their values and future goals may be beneficial (Davies et al., 2006), especially given evidence that targeting beliefs can influence behavior change (Albarracín et al., 2005).

Limitations

Despite the novelty of study findings, the small sample size and low rates of unprotected sex limited power and generalizability. First, we sought to examine how pregnancy concerns and unprotected sex may differ across substance use patterns. We found that dual alcohol + marijuana users had fewer pregnancy concerns compared to alcohol-only, marijuana-only, and non-substance users; however, substance use groups were small, thus lacking power to detect significant effects. Nonetheless, given recent evidence that risk of unprotected sex and unplanned pregnancy vary across different substance use patterns (i.e., Green et al., 2017; Ritchwood, DeCoster, Metzger, Bolland, & Danielson, 2016; Swartzendruber, Sales, Brown, DiClemente, & Rose, 2016), these results encourage further research examining sexual risk behaviors and attitudes across unique substance use patterns. Also, our measure of substance use did not account for frequency of recent use or problematic use; more comprehensive substance use measures are needed to understand potential differences across *type* of substance use as well as problematic use. Second, the majority of the sample was female and African American; a larger, more heterogeneous sample is needed to examine whether the relationship between substance use, pregnancy concerns, and unprotected sex is similar across gender and race/ethnicity. Given the relevance of pregnancy for girls as well as evidence that girls report more concerns about pregnancy (Jaccard et al., 2003), the role of pregnancy concerns in unprotected sex among substance-using adolescents may differ by gender. Last, there are likely other individual and environmental variables related to substance use, unprotected sex, and pregnancy concerns (e.g., socioeconomic status) that may better explain findings. Still, results offer important preliminary evidence for future research.

Conclusions

This is the first study to prospectively examine the role of pregnancy concerns in the link between substance use and unprotected sex. Findings demonstrate that adolescent substance use increases risk for later unprotected sex, and this increased risk is – in part – related to substance users' lack of concerns regarding pregnancy. Findings suggest a novel pathway between substance use and risky sex. Future research should further examine pregnancy concerns and other sexual risk-related attitudes/beliefs among substance users and their role in sexual risk-taking. Next steps might include conducting focus groups with adolescent substance users to better understand adolescents' perspectives on the implications of pregnancy and early parenthood, and how this influences their sexual decision-making. Better understanding of these relationships could inform development of intervention/prevention strategies that could be incorporated into existing adolescent substance use interventions.

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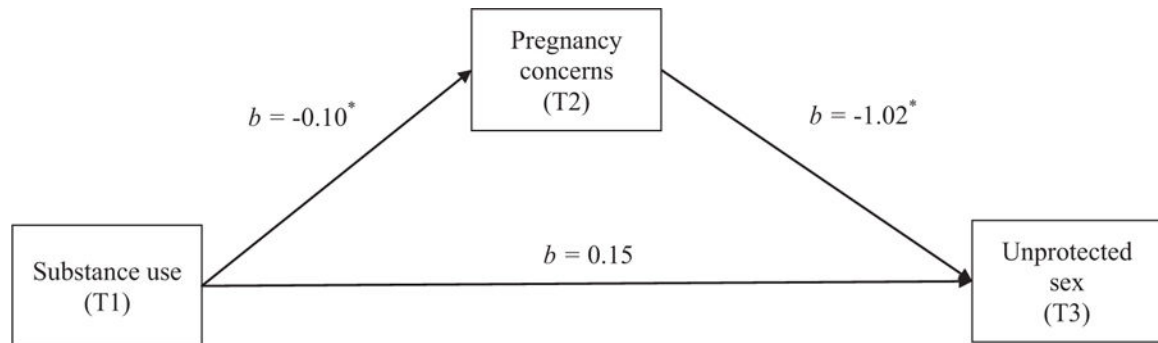


Figure 1.

Longitudinal mediation model predicting unprotected sex. $*p < .05$. Pathways represent direct effects. Values are unstandardized regression coefficients. Gender, race, and age (control variables) are not pictured in the model. Gender effects: T2 pregnancy attitudes ($b = 0.53$, $p = .002$), T3 substance use ($b = 0.22$, $p = .73$). Age effects: T2 pregnancy attitudes ($b = -0.07$, $p = .18$), T3 substance use ($b = 0.16$, $p = .39$). Race effects: pregnancy attitudes ($b = -0.05$, $p = .13$), T3 substance use ($b = 0.03$, $p = .81$). Values are unstandardized regression coefficients. The indirect effect of substance use (T1) on unprotected sex (T3) through pregnancy concerns (T2) was significant ($b = 0.10$, $CI[0.01, 0.41]$). Model $R^2 = 0.22$.

Table 1

Sample demographics.

Variable	<i>M(SD) or n (%)</i>
Gender	
Male	41 (40.6%)
Female	60 (59.4%)
Age	14.28 (1.68)
School Status	
Middle school	68 (68%)
High school	32 (32%)
Race	
White	19 (18.8%)
Black	60 (59.4%)
Asian	1 (1.2%)
Hispanic	6 (5.9%)
Multiracial	14 (13.9%)
Other	1 (1.2%)
Lifetime substance use (T1) ^a	
Alcohol use frequency	2.05 (2.12)
Marijuana use frequency	1.17 (0.49)
Substance use groups (T1)	
Alcohol use only T1	6 (5.9%)
Marijuana use only T1	12 (11.9%)
Dual alcohol & marijuana use T1 ^b	14 (13.9%)
No use	69 (68.3%)
Pregnancy concerns (T2)	3.35 (0.87)
Ever had sex (T3)	29 (28.7%)
Unprotected sex (T3) ^c	17 (16.8%)
Sexual protection/contraception (T3) ^d	
Condom use	24 (23.8%)
Female contraceptive use	13 (21.67%)

N = 98. T1 = baseline, T2 = 3-month follow-up 2, T3 = 6-month follow-up.

^aSubstance use scores are sum of lifetime alcohol and marijuana use.

^bDual use refers to report of both alcohol and marijuana use, not simultaneous alcohol and marijuana use specifically.

^cQuestion is whether individuals used any type of protection at their most recent sexual encounter since T2.

^dQuestion was asked regarding what types of protection individuals *typically* use; individuals were able to select multiple options listed (i.e., condom use and birth control pill).

Table 2

Sex-related variables across substance use patterns.

	No Use (<i>n</i> = 67)	Alcohol only (<i>n</i> = 5)	Marijuana only (<i>n</i> = 12)	Alcohol + Marijuana use (<i>n</i> = 14)	
Pregnancy attitudes	3.48 (0.82) ^a	3.57 (0.58) ^a	3.18 (0.93) ^a	2.75 (0.93) ^b	$F = 3.21, p = .03$
Unprotected sex	11 (15.9%) ^a	2 (33.3%) ^a	2 (16.7%) ^a	10 (71.4%) ^b	$\chi^2 = 19.91, p < .001$
Sex ever	10 (14.5%) ^a	4 (66.7%) ^b	6 (50%) ^b	9 (64.3%) ^b	$\chi^2 = 22.35, p < .001$

Different superscripts denote significant differences across groups. Alcohol + marijuana use refers to those who reported using both alcohol and marijuana, not simultaneous use.